Student: _____	**Instructor:**	**Assignment:** Practice Problems for Test 4
Date: _____	**Course:** Math-1540-W-OL-F18	

1. The functions f and g are integrable and $\int_2^4 f(x)dx = -5$, $\int_2^7 f(x)dx = 2$, and $\int_2^7 g(x)dx = 2$. Use these to complete parts **(a)** through **(f)**.

a. $\int_4^4 f(x)dx =$ _____
(Simplify your answer.)

b. $\int_7^2 g(x)dx =$ _____
(Simplify your answer.)

c. $\int_2^7 9g(x)dx =$ _____
(Simplify your answer.)

d. $\int_4^7 f(x)dx =$ _____
(Simplify your answer.)

e. $\int_2^7 [g(x) - f(x)]dx =$ _____
(Simplify your answer.)

f. $\int_2^7 [5g(x) - f(x)]dx =$ _____
(Simplify your answer.)

2. Evaluate the integral $\int_1^8 x^{-7/3}dx$.

The value of the integral $\int_1^8 x^{-7/3}dx$ is _____.
(Simplify your answer.)

3. Evaluate the integral $\int \sin^2\frac{x}{4}\cos\frac{x}{4}dx$.

$\int \sin^2\frac{x}{4}\cos\frac{x}{4}dx =$ _____

(Use C as the arbitrary constant.)

4. Find the total area of the region between the x-axis and the graph.

$y = x^3 - 4x^2 + 3x,\ 0 \le x \le 3$

Total area = _____ (Simplify your answer.)

5. Evaluate the integral $\int_1^{\sqrt[3]{2}} \frac{s^2 + \sqrt[3]{s}}{s^2} ds$.

The value of the integral $\int_1^{\sqrt[3]{2}} \frac{s^2 + \sqrt[3]{s}}{s^2} ds$ is _____.

(Type an exact answer, using radicals as needed.)

6. Evaluate the integral.

$\int 7x\sqrt{6 - 7x^2}\ dx$

$\int 7x\sqrt{6 - 7x^2}\ dx =$ _____

(Use C as the arbitrary constant.)

7. Evaluate the sum.

$\sum_{n=1}^{8} \left(2 + n^2\right)$

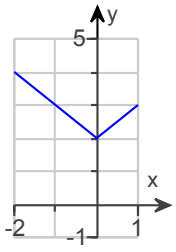
$\sum_{n=1}^{8} \left(2 + n^2\right) =$ _____ (Type an integer or a simplified fraction.)

8. Graph the integrand and use known area formulas to evaluate the integral.

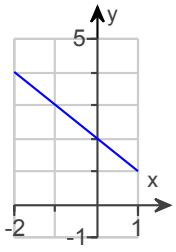
$$\int_{-2}^{1} |2x|\, dx$$

Choose the correct graph of the integrand below.

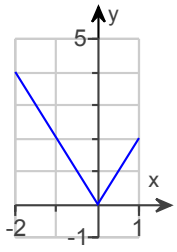
A.



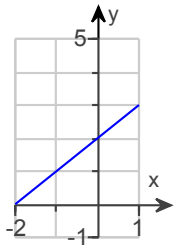
B.



C.



D.



$\int_{-2}^{1} |2x|\, dx =$ _____ (Simplify your answer.)

9. Evaluate the following indefinite integral by using the given substitution to reduce the integral to standard form.

$$\int 4(4x+8)^7\, dx,\ u = 4x+8$$

$\int 4(4x+8)^7\, dx =$ _____
(Use C as the arbitrary constant.)

10. Evaluate the following integral.

$$\int_{0}^{\pi/4} \tan^2 x\, dx$$

$\int_{0}^{\pi/4} \tan^2 x\, dx =$ _____ (Type an exact answer in terms of π.)

11. Using rectangles whose height is given by the value of the function at the midpoint of the rectangle's base, estimate the area under the graph using first two and then four rectangles.

$f(x) = x^2$ between $x = 1$ and $x = 2$

Using two rectangles to estimate, the area under f(x) is approximately _____.
(Type an integer or a simplified fraction.)

Using four rectangles to estimate, the area under f(x) is approximately _____.
(Type an integer or a simplified fraction.)

12. Find the area of the region enclosed by the curves $y = x^2 - 1$ and $y = 3$.

The area of the region enclosed by the curves is _____.
(Type a simplified fraction.)

---

13. Use the substitution formula $\int_a^b f(g(x))g'(x)dx = \int_{g(a)}^{g(b)} f(u)du$, where $g(x) = u$, to evaluate the following integrals.

(a) $\int_0^5 w\sqrt{25 - w^2}\,dw$ **(b)** $\int_{-3}^3 w\sqrt{25 - w^2}\,dw$

(a) $\int_0^5 w\sqrt{25 - w^2}\,dw =$ _____ (Simplify your answer. Type an integer or a simplified fraction.)

(b) $\int_{-3}^3 w\sqrt{25 - w^2}\,dw =$ _____ (Simplify your answer. Type an integer or a simplified fraction.)

---

14. Evaluate the integral $\int \sqrt{2 - 5s}\,ds$.

$\int \sqrt{2 - 5s}\,ds =$ _____
(Use C as the arbitrary constant.)

---

15. Suppose that $\int_6^7 f(x)dx = 8$. Find the value of the following definite integrals. Complete parts **(a)** through **(d)**.

(a) $\int_6^7 f(u)du =$ _____ (Type an exact answer, using radicals as needed.)

(b) $\int_6^7 \sqrt{7}\,f(z)dz =$ _____ (Type an exact answer, using radicals as needed.)

(c) $\int_7^6 f(t)dt =$ _____ (Type an exact answer, using radicals as needed.)

(d) $\int_6^7 [-f(x)]dx =$ _____ (Type an exact answer, using radicals as needed.)

---

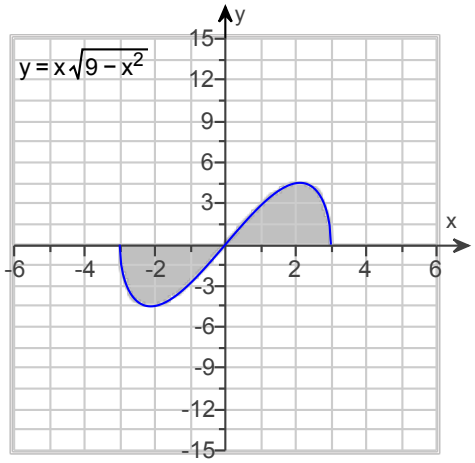
16. Evaluate the integral.

$$\int_0^4 \left(5x^2 - 4x + 2\right) dx$$

$$\int_0^4 \left(5x^2 - 4x + 2\right) dx = \underline{\qquad}$$

(Simplify your answer.)

17. Find the total area of the shaded regions.



The total area of the shaded regions is _____.
(Simplify your answer.)

18. Express the sum in sigma notation.

$$\frac{5}{4} + \frac{5}{16} + \frac{5}{64} + \frac{5}{256}$$

$$\frac{5}{4} + \frac{5}{16} + \frac{5}{64} + \frac{5}{256} = \sum_{k=1}^{\square} \underline{\qquad}$$

(Type an expression using k as the variable.)

19. Solve the initial value problem.

$$\frac{ds}{dt} = 28t(7t^2 - 5)^3, \quad s(1) = 7$$

The solution is s = _____.

20. Use finite approximation to estimate the area under the graph of $f(x) = 2x^2$ and above the graph of $f(x) = 0$ from $x_0 = 0$ to $x_n = 8$ using

i) a lower sum with two rectangles of equal width.
ii) a lower sum with four rectangles of equal width.
iii) an upper sum with two rectangles of equal width.
iv) an upper sum with four rectangles of equal width.

The estimated area using a lower sum with two rectangles of equal width is _____ square units.
(Simplify your answer. Type an integer or a decimal.)

The estimated area using a lower sum with four rectangles of equal width is _____ square units.
(Simplify your answer. Type an integer or a decimal.)

The estimated area using an upper sum with two rectangles of equal width is _____ square units.
(Simplify your answer. Type an integer or a decimal.)

The estimated area using an upper sum with four rectangles of equal width is _____ square units.
(Simplify your answer. Type an integer or a decimal.)

Answers

1. 0

   -2

   18

   7

   0

   8

---

2. $\frac{45}{64}$

---

3. $\frac{4}{3}\sin^3\frac{x}{4}+C$

---

4. $\frac{37}{12}$

---

5. $\sqrt[3]{2}-\frac{3}{2\sqrt[9]{4}}+\frac{1}{2}$

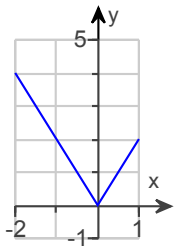
---

6. $-\frac{1}{3}\left(6-7x^2\right)^{3/2}+C$

---

7. 220

---

8. 

   C.

   5

---

9. $\frac{1}{8}(4x+8)^8+C$

---

10. $1 - \frac{\pi}{4}$

---

11. $\frac{37}{16}$

    $\frac{149}{64}$

---

12. $\frac{32}{3}$

---

13. $\frac{125}{3}$

    0

---

14. $-\frac{2}{15}(2-5s)^{\frac{3}{2}} + C$

---

15. 8

    $8\sqrt{7}$

    -8

    -8

---

16. $\frac{248}{3}$

---

17. 18

---

18. 4

    $\frac{5}{4^k}$

---

19. $\frac{1}{2}\left(7t^2-5\right)^4 - 1$

---

20. 128

224

640

480